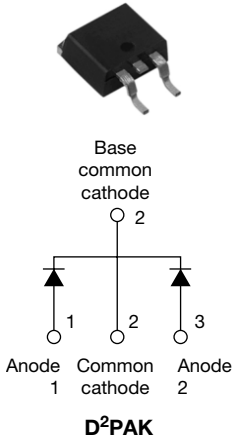
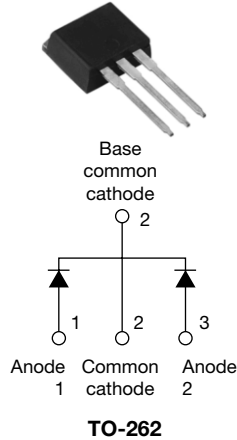


Ultrafast Rectifier, 2 x 5 A FRED Pt[®]

VS-MURB1020CTPbF



VS-MURB1020CT-1PbF



FEATURES

- Ultrafast recovery time
- Low forward voltage drop
- Low leakage current
- 175 °C operating junction temperature
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Halogen-free according to IEC 61249-2-21 definition
- Compliant to RoHS directive 2002/95/EC
- AEC-Q101 qualified



RoHS
COMPLIANT
HALOGEN
FREE

DESCRIPTION/APPLICATIONS

MUR.. series are the state of the art ultrafast recovery rectifiers specifically designed with optimized performance of forward voltage drop and ultrafast recovery time.

The planar structure and the platinum doped life time control, guarantee the best overall performance, ruggedness and reliability characteristics.

These devices are intended for use in the output rectification stage of SMPS, UPS, dc-to-dc converters as well as freewheeling diode in low voltage inverters and chopper motor drives.

Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

PRODUCT SUMMARY

t_{rr}	25 ns
$I_{F(AV)}$	2 x 5 A
V_R	200 V

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Peak repetitive reverse voltage	V_{RRM}		200	V
Average rectified forward current	$I_{F(AV)}$	per leg	5	A
		total device	10	
		Rated V_R , $T_C = 149\text{ °C}$	10	
Non-repetitive peak surge current per leg	I_{FSM}		50	
Peak repetitive forward current per leg	I_{FM}	Rated V_R , square wave, 20 kHz, $T_C = 149\text{ °C}$	10	
Operating junction and storage temperatures	T_J, T_{Stg}		- 65 to 175	°C

ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ °C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	V_{BR}, V_R	$I_R = 100\text{ }\mu\text{A}$	200	-	-	V
Forward voltage	V_F	$I_F = 5\text{ A}, T_J = 125\text{ °C}$	-	0.87	0.99	
		$I_F = 10\text{ A}, T_J = 125\text{ °C}$	-	1.02	1.20	
		$I_F = 10\text{ A}, T_J = 25\text{ °C}$	-	1.12	1.25	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	-	10	μA
		$T_J = 150\text{ °C}, V_R = V_R$ rated	-	-	250	
Junction capacitance	C_T	$V_R = 200\text{ V}$	-	8	-	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	8.0	-	nH

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DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Reverse recovery time	t_{rr}	$I_F = 1.0\text{ A}$, $di_F/dt = 50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	-	35	ns	
		$I_F = 0.5\text{ A}$, $I_R = 1.0\text{ A}$, $I_{REC} = 0.25\text{ V}$	-	-	25		
		$T_J = 25\text{ }^\circ\text{C}$	-	24	-		
		$T_J = 125\text{ }^\circ\text{C}$	-	35	-		
Peak recovery current	I_{RRM}	$I_F = 5\text{ A}$ $di_F/dt = 200\text{ A}/\mu\text{s}$ $V_R = 160\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$	-	3.3	-	A
			$T_J = 125\text{ }^\circ\text{C}$	-	5.0	-	
			$T_J = 25\text{ }^\circ\text{C}$	-	33	-	
Reverse recovery charge	Q_{rr}	$T_J = 125\text{ }^\circ\text{C}$	-	76	-		

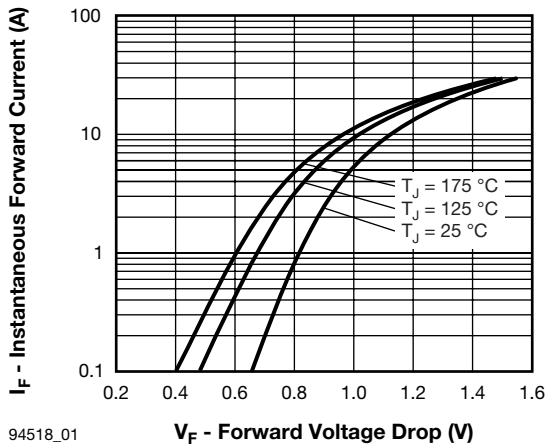
THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J , T_{Stg}		- 65	-	175	$^\circ\text{C}$
Thermal resistance, junction to case per leg	R_{thJC}		-	-	5	$^\circ\text{C}/\text{W}$
Thermal resistance, junction to ambient per leg	R_{thJA}		-	-	50	
Thermal resistance, case to heatsink	R_{thCS}	Mounting surface, flat, smooth and greased	-	0.5	-	
Weight			-	2.0	-	g
			-	0.07	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style D ² PAK	MURB1020CT			
		Case style TO-262	MURB1020CT-1			



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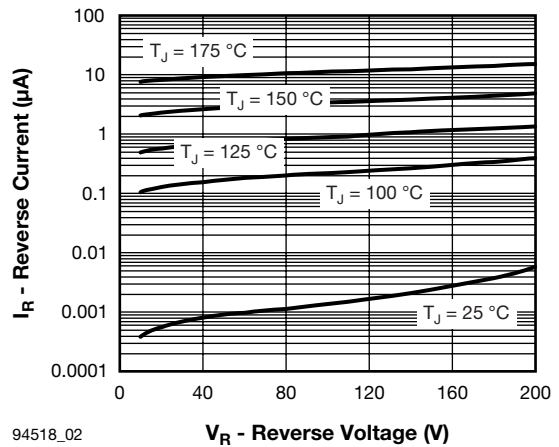
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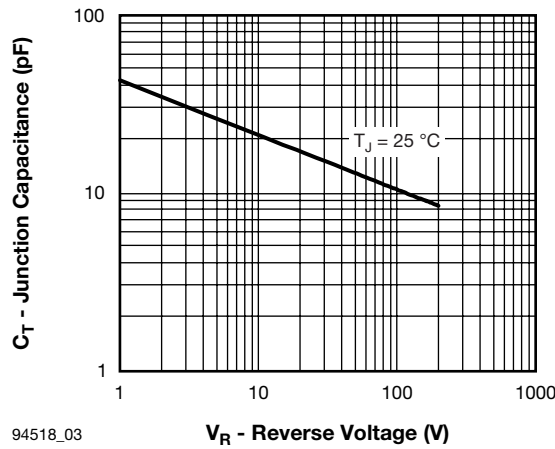
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Fig. 1 - Typical Forward Voltage Drop Characteristics



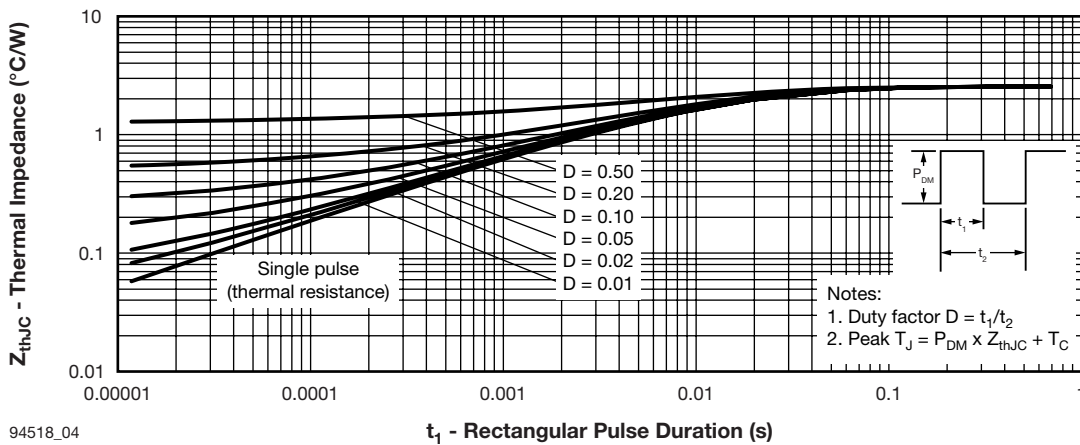
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Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage



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Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage



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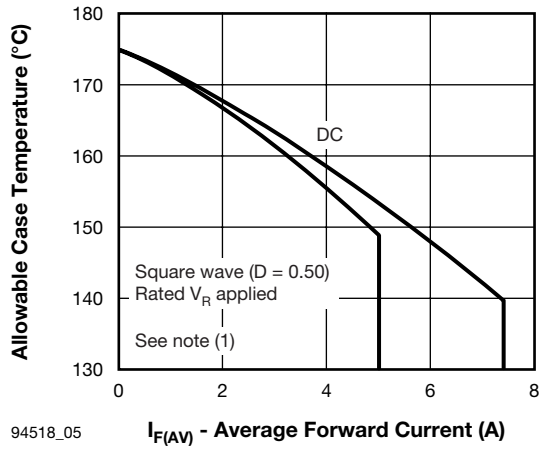
Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

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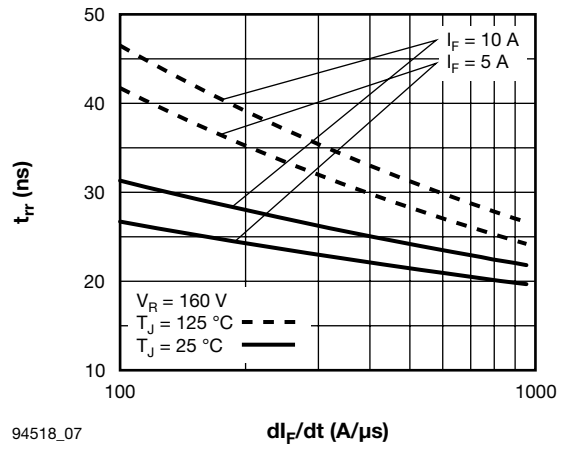
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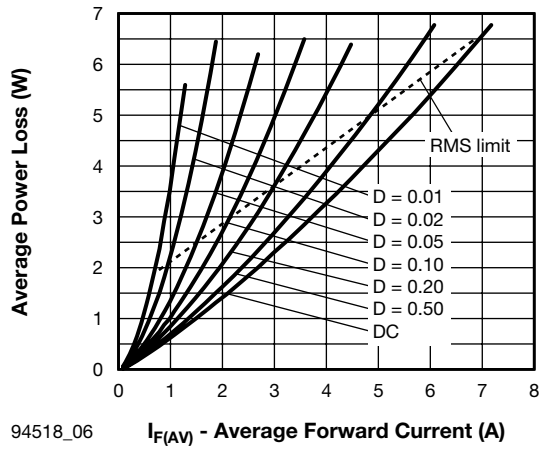
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Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current



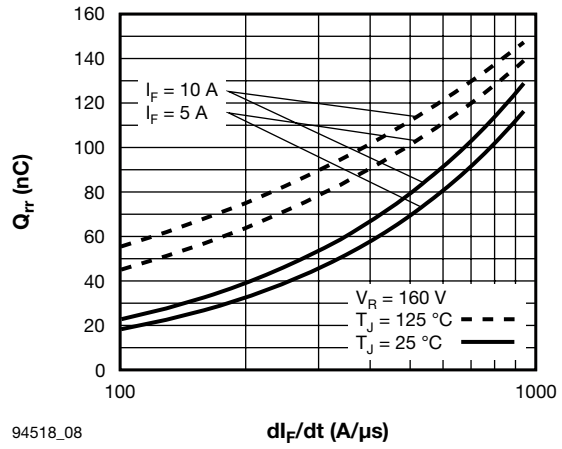
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Fig. 7 - Typical Reverse Recovery Time vs. di_F/dt



94518_06

Fig. 6 - Forward Power Loss Characteristics



94518_08

Fig. 8 - Typical Stored Charge vs. di_F/dt

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;
 P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 $P_{d_{REV}}$ = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = Rated V_R

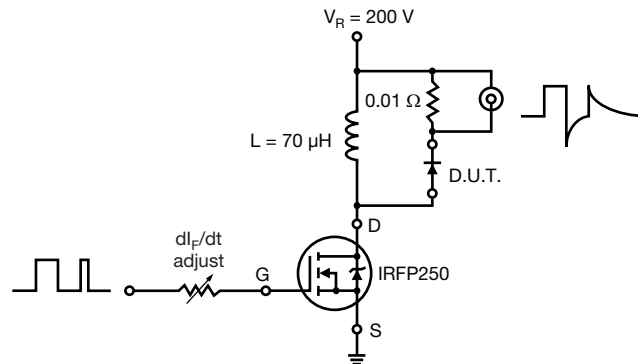
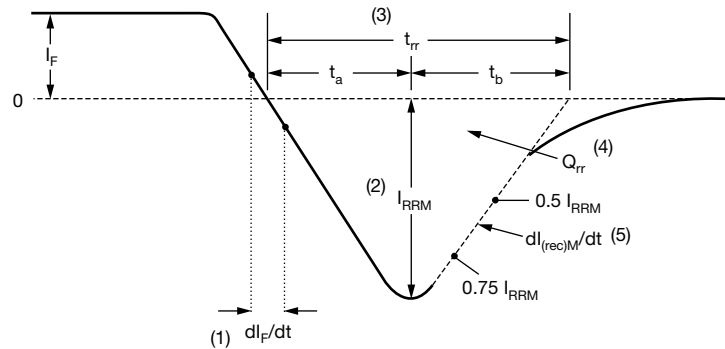


Fig. 9 - Reverse Recovery Parameter Test Circuit



(1) dI_F/dt - rate of change of current through zero crossing

(2) I_{RRM} - peak reverse recovery current

(3) t_{rr} - reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through $0.75 I_{RRM}$ and $0.50 I_{RRM}$ extrapolated to zero current.

(4) Q_{rr} - area under curve defined by t_{rr} and I_{RRM}

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

(5) $dI_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

Fig. 10 - Reverse Recovery Waveform and Definitions

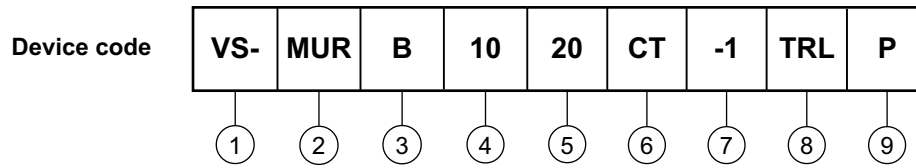
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ORDERING INFORMATION TABLE



- 1** - HPP product suffix
- 2** - Ultrafast MUR series
- 3** - B = D²PAK/TO-262
- 4** - Current rating (10 = 10 A)
- 5** - Voltage rating (20 = 200 V)
- 6** - CT = Center tap (dual)
- 7** -
 - None = D²PAK
 - -1 = TO-262
- 8** -
 - None = Tube (50 pieces)
 - TRL = Tape and reel (left oriented, for D²PAK package)
 - TRR = Tape and reel (right oriented, for D²PAK package)
- 9** -
 - PbF = Lead (Pb)-free (for TO-262 and D²PAK tube)
 - P = Lead (Pb)-free (for D²PAK TRR and TRL)

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95014
Part marking information	www.vishay.com/doc?95008
Packaging information	www.vishay.com/doc?95032



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